

Application number 10/665,991
Amendment dated May 1, 2006
Reply to office action mailed November 2, 2005

PATENT

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figure 1A. Specifically, Figure 1A is now labeled as prior art. This sheet, which includes Figures 1A and 1B replaces the original sheet including Figures 1A and 1B.

Attachment: Replacement Sheet

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REMARKS/ARGUMENTS

After entry of this amendment, claims 9-11, 15-18, 20-21, and 23-38 will be pending in this application. Claims 9 and 15 have been amended. Claim 11 has been amended to correct a typographical oversight. Claim 22 has been cancelled. Claims 18, 23, and 24 have been rewritten as independent claims. New claims 25-38 have been added. Support for the new and amended claims can be found in the specification. No new matter has been added.

Claims 9-11, 15-17, and 20-22 stand rejected under 35 U.S.C. 103(a) as being unpatentable over acknowledged prior art in view of Izadnegahdar et al., United States patent application number 2003/0029245 (Iza). Reconsideration of these rejections and allowance of the pending claims in light of these amendments and remarks is respectfully requested.

Claim 9

Claim 9 stands rejected under 35 U.S.C. 103(a) as being unpatentable over acknowledged prior art in view of Iza. But this combination does not show each and every element of this claim. For example, claim 9, as amended, recites "a diaphragm and a sidewall, the sidewall having an interior side defining a backside cavity, the backside cavity extending from a portion of an insulator layer directly in contact with the diaphragm to a backside opening." The combination of Iza and the admitted prior art does not provide this feature.

The pending office action cites Iza as showing each feature of this claim except for the diaphragm and sidewall. (See pending office action, page 2, paragraph 3a.) But Iza does not provide a backside cavity extending from a portion of an insulating layer directly in contact with the diaphragm to a backside opening.

A backside cavity 56 is shown in Figure 13 of Iza. This backside cavity 56 extends from a diaphragm 12 to a portion of an insulating layer 112. However, this portion of the insulating layer 112 is not directly in contact with the diaphragm 12 as is required by the claim. Rather, this portion of the insulating layer 112 is on the opposite side of the backside cavity 56 away from the diaphragm 12. Accordingly, Iza does not provide the backside cavity extending from a portion of an insulating layer directly in contact with the diaphragm to a backside opening.

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as required by the claim. The admitted prior art adds nothing to this, as it does not include an insulating layer.

Claim 9, as amended, further recites "wherein the deep reactive ion etch begins at the backside opening and etches towards the diaphragm at a rate that is substantially reduced when the insulator layer is reached." The combination of Iza and the admitted prior art do not provide this feature.

In Figure 11, Iza shows an etch being performed to create a cavity 56. (See Iza, paragraph 48.) But this etch is not done towards the diaphragm as required by the claim. Rather, the etch is into the base layer 50 away from where the diaphragm 12 is later placed in Figure 13. Moreover, this etch is not slowed when an insulator layer is reached, as Iza does not provide the required insulating layer. Accordingly, Iza does not provide a deep reactive ion etch beginning at the backside opening and etching towards the diaphragm at a rate that is substantially reduced when the insulator layer is reached as is required by the claim.

For at least these reasons, claim 9 should be allowed.

Claims 10 and 11

Claim 10 and 11 stand rejected under 35 U.S.C. 103(a) as being unpatentable over acknowledged prior art in view of Iza. Specifically, the pending office action states that the shape of a component is generally recognized as being within the level of ordinary skill in the art. MPEP 2144.04 is cited for this proposition.

But this MPEP section cites a case where shape was a matter of choice. That is not true in this situation. Rather, as described in the specification, the shapes recited in these claims provide specific benefits and are not simply a matter of design choice.

For example, claim 10 recites "wherein the backside opening forms a rounded square." As described in the pending application, this shape increases stress lines in the direction of specific resistors, while stress lines between resistors is reduced. (See pending application, paragraph 49 and Figure 4C.) Further, this shape provides additional space for topside bond pads. (See pending application, paragraph 50.)

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Similarly, claim 11 recites "wherein the backside opening is shaped as a castle." As described in the pending application, this shape further reduces stress lines between resistors. (See pending application, paragraph 51 and Figure 4D.) Accordingly, these shapes are not simple matters of design choice.

For at least these reasons, claims 10 and 11 should be allowed.

Claim 20

Claim 20 stands rejected under 35 U.S.C. 103(a) as being unpatentable over acknowledged prior art in view of Iza. But this combination does not show each and every element of this claim. For example, claim 20 recites "wherein the plurality of pressure sensors includes approximately at least twenty-thousand pressure sensors, and wherein the silicon wafer is a 150mm (6 inch) wafer." This combination does not provide these features.

The pending office action cites Iza as showing each feature of this claim except for the diaphragm and sidewall. (See pending office action, page 2, paragraph 3a.) However, the pending office action does not appear to point out where this feature is shown or suggested in either Iza or the admitted prior art. In fact, Iza does not appear to provide at least twenty-thousand pressure sensors on a 150mm (6 inch) silicon wafer. Moreover, the admitted prior art adds nothing on this point.

For at least these reasons, claim 20 should be allowed.

Claim 21

Claim 21 stands rejected under 35 U.S.C. 103(a) as being unpatentable over acknowledged prior art in view of Iza. But this combination does not show each and every element of this claim. For example, claim 21 recites " wherein the diaphragm is less than 350 microns in length, and the diaphragm accounts for more than 10 percent of an area of the exactly one pressure sensor." This combination does not provide these features.

The pending office action cites Iza as showing each feature of this claim except for the diaphragm and sidewall. (See pending office action, page 2, paragraph 3a.) However, the pending office action does not appear to point out where this feature is shown or suggested in either Iza or the admitted prior art. In fact, Iza does not appear to provide a diaphragm less than

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350 microns in length. Moreover, the admitted prior art adds nothing on this point, as it only discusses a diaphragm of 1000 microns. (See pending application, paragraph 4.)

For at least these reasons, claim 21 should be allowed.

Other claims

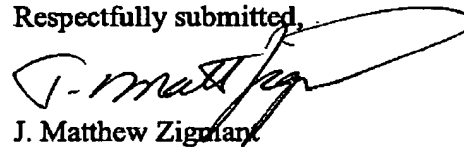
Claim 15 should be allowed for similar reasons as claim 9. The other rejected claims depend on one of the above claims and should be allowed for similar reasons and for the additional limitations they recite.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this application are in condition for allowance. The issuance of a formal notice of allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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Attachments
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